

CLAIMS

WHAT IS CLAIMED IS:

- 1 1. A method of analyzing anisotropic turbulent flows of an anisotropic fluid
2 comprising:
3 defining a set of moment equations governing time average thermal and turbulent
4 motion, directional kinetic energy, shear, directional kinetic energy fluxes, and structure
5 correlations; and
6 defining n^{th} order directional kinetic energy fluxes and structure correlation
7 equations closure relationships using $(n + 1)^{\text{th}}$ order density gradient independent time
8 average thermal and turbulent moment closure relationships to yield a set of closed time
9 average turbulent moment equations.
- 1 2. The method of claim 1 wherein the set of moment equations governing time average
2 turbulent directional kinetic energy, shear, directional kinetic energy fluxes, and structure
3 correlations is defined by Equation Set 12.
- 1 3. The method of claim 1 wherein n is odd.
- 1 4. The method of claim 3 wherein the density gradient independent time average
2 thermal moment closure relationships are defined by Equation Set 16.
- 1 5. The method of claim 3 wherein the density gradient independent time average
2 turbulent moment closure relationships are defined by Equation Set 17.

1 6. The method of claim 1 further comprising solving $(n + 1)^{\text{th}}$ and $(n + 2)^{\text{th}}$ order
2 moment sets.

1 7. The method of claim 1 wherein the set of closed time average turbulent moment
2 equations are defined by Equation Set 15.

1 8. A method of analyzing time average directional thermal energy in turbulent flows of
2 an anisotropic fluid by solving Equation 15-3.

1 9. A method of analyzing time average thermal shear in turbulent flows of an
2 anisotropic fluid by solving Equation 15-4.

1 10. A method of analyzing time average directional thermal energy fluxes in turbulent
2 flows of an anisotropic fluid by solving Equations 15-5 and 15-6.

1 11. A method of analyzing time average thermal structure correlation in turbulent flows
2 of an anisotropic fluid by solving Equation 15-7.

1 12. A method of analyzing time average directional turbulent energy in turbulent flows
2 of an anisotropic fluid by solving Equation 15-8.

1 13. A method of analyzing time average turbulent shear in turbulent flows of an
2 anisotropic fluid by solving Equation 15-9.

1 14. A method of analyzing time average turbulent directional energy fluxes in turbulent
2 flows of an anisotropic fluid by solving Equations 15-10 and 15-11.

1 15. A method of analyzing time average turbulent structure correlation in turbulent flows
2 of an anisotropic fluid by solving Equation 15-12.

1 16. A method of analyzing turbulent flows of an isotropic liquid comprising:
2 defining a set of moment equations governing time average directional kinetic
3 energy, shear, directional kinetic energy fluxes, and structure correlations;
4 defining n^{th} order directional kinetic energy fluxes and structure correlation
5 equations closure relationships using $(n + 1)^{\text{th}}$ order density gradient independent time
6 average thermal and turbulent moment closure relationships to yield a set of closed time
7 average turbulent moment equations;
8 setting all directional thermal energies equal and solving the total thermal energy
9 equation;
10 setting density equal to a constant.

1 17. The method of claim 16 further comprising solving the resultant equation set.

1 18. The method of claim 16 further comprising adding the resulting turbulent flow
2 equation set to conventional Navier Stokes equations for isotropic fluids and solving the now closed
3 turbulent Navier Stokes set.